A Technological Feedback Approach for Customer Satisfaction

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Abstract- This paper presents a technological feedback approach forsatisfaction of customers.Where, the information regarding product or service is collected by manufacturer or service provider from customer side and with the use of Mathematical–Statistical techniques along with the Information Communication Technology (ICT) based tools, the information is instantly analysed such that the appropriate steps can be taken immediately in order to satisfy the need of a customer. Here, the information collected from customers is in the digital form and the nature of feedback is to be in the form of fixed or in open handed. The feedback in fixed form mostly a quantitative information is analysed by Mathematical-Statistical tools while the open handed a unstructured qualitative information is analysed by ICT based tools which convert the unstructured data to semi structured and then into structured data from which the knowledge is fetched regarding customer's satisfaction level.

Keywords- Customer Feedback,ICT based tool, Fixed and Open Handed form of information, Mathematical-Statistical Techniques, Customer's satisfaction.

I. INTRODUCTION

A market is a body of business men, manufacturers, distributors, service providers and customers they are inter-correlated with each other and many dependencies exist from top to bottom [1]. As said, customer is the king of market, the growth of market mainly depends upon the behaviour of customer and he is the main base of market chain [1],[2]. Thus, every market strategies or policies implemented are directly or indirectly focused by customer. In market world,customer has only opportunity to vary by his own self but remaining cannot be,as they are dependent on customer. They have to follow according to the behaviour of customer. Also, in market there are many industries which are working together, many are competitorssuch that, in the competition it is difficult for them to maintain their own position even increase their product market [2],[3]. In such a situation manufactures or service providershave to maintain the satisfaction level of their customers. In order to satisfy customer's need, one has to be taken care of quality of product, price, product quantity, user friendliness, affecting

the modernization, culture, income, life style etc. [4]. By considering the need of customer satisfaction, manufacturers apply different strategies, sometime they increase some percentage in the quantity of product, reduction in price, extra gifts, prizes, also timely change in product quality, differentiate the packaging as quantity wise so that, a common customers can purchase the product and also they give some discount or other offers on purchasing some amount of product [4].

II. FEEDBACK APPROACH FOR CUSTOMER'S SATISFACTION

For a manufacturer, it is really needed to know that, is the customer satisfied by his product? What would be the response from customer side regarding the product quality and quantity? It is also important to known that, is the product fulfil their requirements? How a manufacturer can judge that, his product is suitable with need of customer, how he can improve his product according to time and condition. These are the different obstacles in maintaining product position in market. Such that, manufacturer should be aware with the customer's behaviour towards his product and for that at regular time interval he has to take feedback from customer side regarding his product. Thus, the appropriate strategies can be adopted to prior and action can be implemented before the time [5].

The customer's feedback can be taken mainly in two different ways (i) Verbal Feedback (ii) Non-Verbal Feedback [6],[7]. In the form of verbal feedback, oral personal interview, telephonic or by video conference through feed-back is taken while, in non-verbal feedback, a well prepared questionnaire is filed up by customers. These are the traditional methods of taking feedback from customers. Now a days, Information Communication Technology (ICT) has got tremendous growth and has changed the routine ways of communication and opened up various gates of communication. Therefore, definitely we should modernize the feed-back technique with new aspects of ICT which is providing various opportunities [8]. Also, there are certain limitations of traditional methods which can be overcome by ICT based feedback approach. Through the traditional

methods, it may not be possible to cover up big mass of customers within a short period of time and with less consuming process. As far as the speed of variation in market growth is concern, the speed of feedback process with proper accuracy has to be matched such that, the decision making process can become faster [9]. A long period of time and a long process may reduce the accuracy of decision thus, for an easy, effective, and accurate process we have to take the help of ICT based tools and techniques. Especially, while mobile and internet has become a companion of a human being. Even in market world everywhere the business such as marketing, banking, selling and purchasing, stock marketing etc. has become based on ICT. Also through the digital marketing on mobile, business world has got rapid growth [10].

With this consideration, researcher has discussed the ICT based analysis of feedback by using a technological approach for customer satisfaction. In which, customers give their feedback regarding the respective product or service by digitally. Which is timely analysed by computer and the result will be displayed automatically which will be useful in fast decision making. The proposed system can be shown as below;
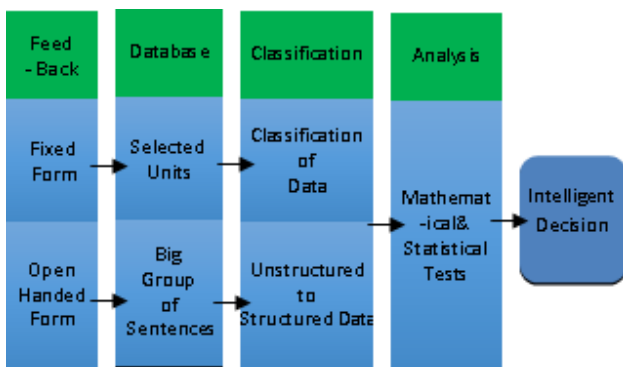

Fig 1. Feedback Analysis System

Fig. 1 shows that the customer feedback is digitally taken into two different forms, Fixed and Handed which is directly stored in computer database. The fixed data mostly in the quantitative opinion form while the open handed data is in group of unstructured sentence form. Further, the fixed data is classified into scale, priority, grade or in weighted units and sentences are classified from unstructured information to structured form with the use of Mathematical – Statistical Tests and ICT tools respectively. Finally the ultimate knowledge is derived regarding customer's satisfaction. The whole process of fetching knowledge from raw information is described in detail as follows.

III. FIXED FORM FEEDBACK

This form is especially for company, wants to know the belief of customer about particular phenomena of the product. Here company will asked those kind of questions about to check customer's opinion for its product through well prepared questions with their well prepared possible answers that the company wants to know. Customers have to choose only one of them.That means, customers are free to choose one the answer according to their belief but they are not free to give their own opinion which are not included in the list of the answers. Suppose a company wants to check the satisfactory level of customer about its product, it can ask the following type of well prepared questions with its pre required possible answers;

Que.:How much you are satisfied with our product?
☐ Very Good   ☐ Good   ☐ Neutral

☐ Bad   ☐ Very Bad
Choose one of the answers from above.

Customer has to choose one of the above from the given list of answers. Here, multiple type of questions can also be asked with more than one answers or opinions which can provide more information as well.
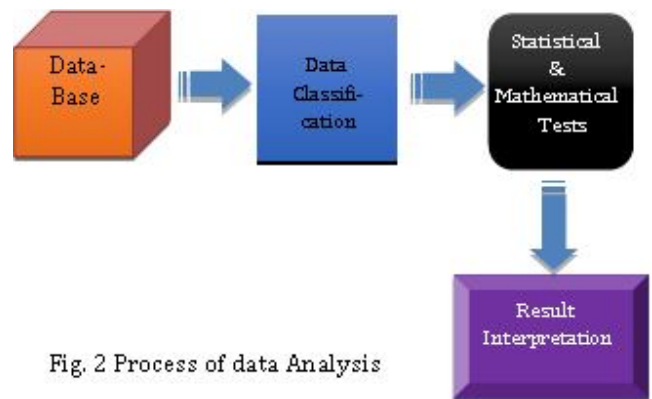
A.   Data Analysis

Fig. 2 Process of data Analysis

(i)   Preparation of Database:

The digital feedback is taken from customer in fixed form,it is become easy to make its database because it is a quantitative information or already quantified by the system of questionnaire. First of all system will collect all the information collected by digitally and stored them in database. These data are the primaryinformation which may be unformulated and uncategorised.

(ii) Data Classification:

System classifies or formulates all the obtained data in particular category as per the requirement of analysis and prediction process. In the fixed from, if the information is collected scale wise then the particular unit is allocated to the particular scale for accurate interpretation. If the answers are in multiple form then bi-variate classification is prepared, so it is depend upon how the informationhave been collected from customer.

(iii) Statistical & Mathematical Test:

- Developed Database and data warehousing technology [7] can be used for to store and retrieve large amounts of data; it can be in form of both text and image.
- To find out knowledge form feedback data, Data mining techniques [8],[9],[10] could give potential useful advice depending upon the data management. Also, modelling and simulation technology can be used to model an ideal situation and predict the intelligent decision and other techniques by considering a specific situation.
- To find out the risk form feedback data, risk analysis tools can be useful for selecting healthy management and the accurate prediction of decision. [11]
- Fuzzy logic [15],[16], Testing of hypothesis (ANOVA test, t-test, chi-test) are useful for decision-making process.
- Operation research based optimum techniques and models also played an important role to manage multiple opinions and to fetch optimum result from database [17].
- Data Extraction tool, Data Integration tool, Data Cleaning, Data Dictionary, Qualitative to Quantitative approach[9],[10].

Thusby using the several mathematical & statistical tools and techniques the required knowledge can be derived from the data set, and it is not only based on passed data but by including the current data as well. The analysis will be automatically updated with the update of dataset.

Here researcher has explained an illustration, how the analysis is performed on particular data of particular study.

B. *Examples:*

Suppose Hero Honda Bike Company wants;

- ➤ To know the factors affect the consumer's attitude towards Hero Honda two-wheelers.
- ➤ To know the perception of consumer's about Hero Honda two-wheeler.
- ➤ To determine the brand image about Hero Honda two-wheelers
- ➤ To find out positioning of Hero Honda in customer's mind.

The feedback of customers is taken by internet – Email and through mobile- SMS which is in both forms, fixed and open handed.

Que:1Look of Hero Honda bike is Stylish [Eye Catching]
1. Strongly Disagree2. Disagree   3. Neutral
4. Agree 5. Strongly Agree.

Here each customer will choose one of the aboveoptions.

(i) *Purpose:*

To know how many customers give important to look in their Hero Honda bike

(ii) *Inference:*

Null Hypotheses (H_0): There is no significant difference between the calculated sample mean and hypothesized populations mean (4.00). In other words, we hypothesize that the customers agree that that they want to stylish look in two-wheeler.
H_0: x = μ = 4.0

Alternative Hypothesis (H_1): There is significant difference between calculated mean and hypothesized population mean. In other words, the customers are not agree about,they want stylish look in two-wheeler.
H_1: x ≠ μ

Statistical Test: One sample t-test is chosen because the measurement of data is interval in nature.

Significance level: 0.05

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Looks	150	4.58	.797	.065

One-Sample Test

	Test Value = 4					
	T	df	Sig.2-tailed	Mean Diff.	95% Confidence Interval of the Difference	
					Lower	Upper
Looks	8.918	149	.000	.580	.45	.71

Table 1. Statistical Result (t-test)

(iii) Interpretation:

Here, one sample t-test is conducted and the p-value is 0.000, less than the significance level value of 0.05, so our null hypothesis is rejected and alternative hypothesis is accepted. In other word, we can say that the customers are not agree that they want to stylish look, here t value is positive it means that they are more than agree or in between strongly agree and agreeabout stylish look in Hero Honda bike.

IV. OPEN HANDED FORM FEED-BACK

.It is especially for customer to give his own opinion regarding to a product, here customer can express his own views and thoughts. When company wants to know what customersthink about its product, are they satisfied withit and is there any suggestion in improvement?Here,customer is independent to give his opinion, no restriction at all. So, he will give his opinion positively or negatively in full description through digital SMS or Email. All the feedback will be in the word and which is totally qualitative response and may be unstructured. For further analysis it is necessary to set the unstructured information into structured form and also necessary to quantify the data.

It is difficult to convert unstructured data into structured data directly. One approach is, those first converted unstructured data into semi-structured data and then try to convert it in structured data.
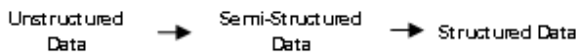

Fig. 3 Unstructured to Structured Conversion

It is easy to convert semi-structured data into structured form. Now a day, conversion of semi-structured data in to structured form is not much tuff with latest technological tools. The procedure is, first extract the data from the documents with data extraction tool like I MACRO [8] and store into database. It may or may not be in proper form, possibly some of the data in unstructured form having

missing data so again data cleaning procedure technique is required. Now a days, so many data cleaning tools like SPIDER [9], WinPure ListCleaner Pro [10], as well as for field like business specific Pentaho tool [11] are available which work with their intelligence and covert data in structured form. Also image comparer tools available like AKS Image Comparer [12], ELImageCompare [13] etc.
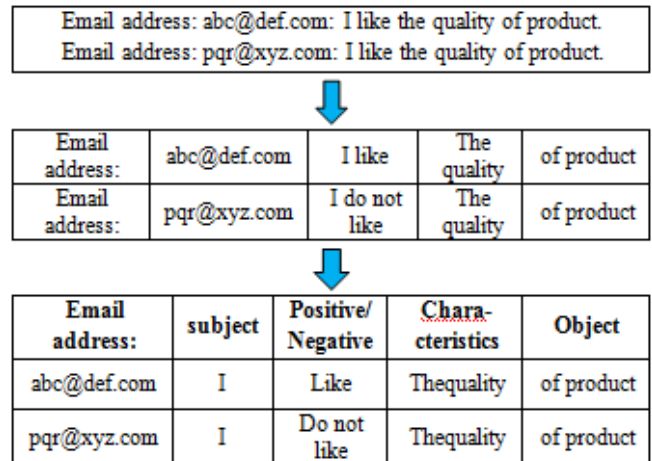

Fig. 4 Semi-Structured Form

Here we have taken only one example (See Fig. 4) of feedback regarding the likeness of quality of product but it can be differfor different phenomena of the respective product. Also, different customers have their different opinion which are taken in digital form an obviously it is of open handed type and in unstructured form. Thus, a set of various questions have multiple type of open handed answers stored in database having unstructured data. It really difficult to convert these unstructured data in semi-structured or structured form. For that it is necessary to develop software according to the data.

For example, in survey system surveyor setsa question whose answer is in qualitative data, differ with respect to responder. When we convert such kind of unstructured data in to semi-structured data form, it is necessary to categorize the collected data by Indexing, ranking, scoring, tagging and convert in form of structured or semi structured form. From the Fig. 5 it is very much cleared that firstly identify the nature of data which is too tuff and difficult for computer as it is not a human andclear those data having complex characteristics and according to thatprepare software tools.
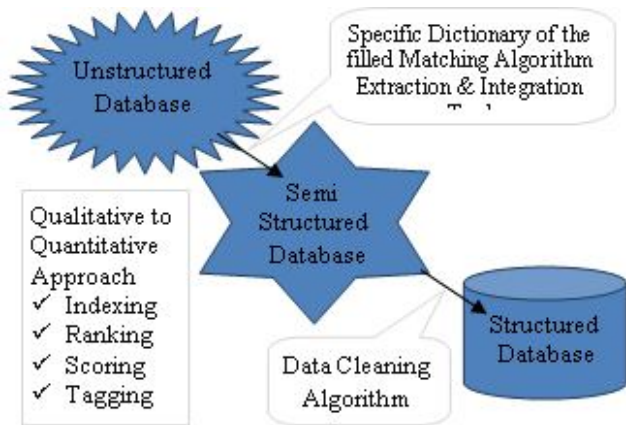
Fig. 5 Unstructured to Structured Database

Which firstly convert data in semi structured form and then by cleaning algorithm in structured form. Tools and techniques to convert unstructured data in structure form:

(1) Data Extraction tool
(2) Data Integration tool
(3) Data Cleaning
(4) Data Dictionary
(5) Qualitative to Quantitative approach

Researcher, work with the above approach to convert the customer feedback of features of Hero Honda Bike particularly for the pickup of bike which is in qualitative form. In feedback, both types of data qualitative and quantitativeare involved. It is easy to extract quantitative data in structured form but for qualitative data i.e. Unstructured data it is difficult, so that it is necessary to extract data form feedback form according to question and then try to convert it in quantitative form as follows;
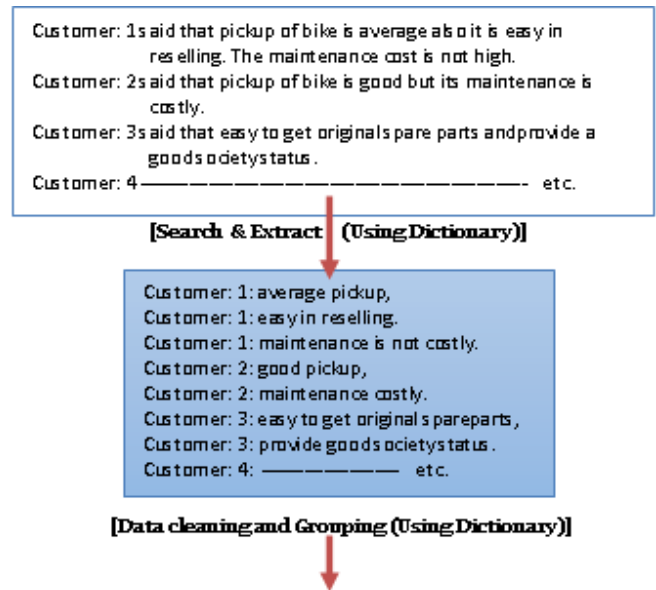
Fig. 6 Unstructured Customer Feed-back in Structured Form

Up till now whatever work has been done is trial base with software and some satisfactory result has been observed.

V. EXPERIMENT – ILLUSTRATION

Que:3 What you think about the Pick-up of the bike?
Respondent- 1: Email/ Mobile No: X : Hero Honda bike has average pickup.
Respondent- 2: Email/ Mobile No: Y : Hero Honda bike has not good pickup.
Respondent- 3: Email/ Mobile No: Z : Hero Honda bike has good pickup.

Here the feedback is in sentence form and there are no predefined answers/options are given so customers are free to give their views in written form or in sentence form. The information is given in the form of different sentences may in unstructured form so to get the knowledge from the given data first of all it must be converted into structured form and then further analysis can be carried out.

Respondent 1	Email/ Mobile No:	X	Hero Honda bike	has	average	Pickup
Respondent 2	Email/ Mobile No:	Y	Hero Honda bike	has not	good	Pickup
Respondent 3	Email/ Mobile No:	Z	Hero Honda bike	has	good	Pickup

Respo-ndent	Email/ Mobile No:	subject	Positive or negative	Scale	Charact-eristics
1	X	Hero Honda bike	has	average	Pickup
2	Y	Hero Honda bike	has not	good	Pickup
3	Z	Hero Honda bike	Has	good	Pickup

Respondent	Scale	Characteristics
1	Average	Pickup
2	not good	Pickup
3	Good	Pickup

Fig. 7 Open Handed Feedback Analysis

This is how system converts the unstructured data in structured form and derives the individual opinion from the sentence form and can classify it for further analysis.

(i) Purpose:

To know how many customer give important to pick up, this will show their attitude about pick up in their Hero Honda bike.

(ii) Inference:

Null Hypotheses (H₀): There is no significant difference between the calculated sample mean and hypothesized populations mean (4) In other words, we hypothesize that the customers say that their Hero Honda bike has good pickup.

$H_0: x = \mu = 4$

Alternative Hypothesis (H₁): There is significant difference between calculated mean and hypothesized population mean. In other words, the customers that their Hero Honda bike has not well pickup.

$H_1: x \neq \mu$

Statistical Test: One sample t-test is chosen because the measurement of data is interval in nature.

Significance level: 0.05

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Pick-up	150	4.49	.775	.063

One-Sample Test

	Test Value = 4					
	T	df	Sig. 2-tailed	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pick-up	7.69	149	.000	.487	.36	.61

Table 2. Pickup - Statistical Output (t-test)

(iii) Interpretation:

Here, one sample t-test is conducted and the p-value is 0.000, less than the significance level value of 0.05, so our null hypothesis is rejected and alternative hypothesis is accepted. In other word, we can say that customers say that Pick-up of Hero Honda bike is not well.

This is the only one characteristic of Hero Honda bike has been taken, similarly more than one characteristics can be measured either individually or in group and the opinion of customers can be analysed and overall knowledge can be derived from information.

VI. CONCLUSION

The adoption of a technological approach for customer feedback increase the connectivity between customer and manufacturer. The instant feedback of customer regarding a product and its quick analysis creates an opportunity for manufacturer to resolve any problem instantly regarding any attributes of product or services. Also, the knowledge provided by the analysis of feedback data, helps a service provider or manufacturer to design his future strategies to reach up to the satisfaction level of his customer and ultimately the decision making process is become smoother and faster.

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